CLAIMS

What is claimed is:

1. A turbine wheel for driving rapidly rotating tools, particularly for the rotating disks and/or domes of paint-spraying apparatus, said turbine wheel comprising:

a carrier plate formed as a circular disk or ring, said plate having a central axis and configured for mounting so as to be rotatable about the axis;

turbine blades disposed on the carrier plate in circular formation and curved in a direction perpendicular to the axis, said turbine blades comprising;

a front face; and

a back face, mounted so that said front and back faces are axially parallel;

wherein each of said faces has radially outer portions and radially inward portions with radii of curvature, such that at least portions of the front face have a lesser radius of curvature than the back face, and the radially outer portions of the front face and of the back face have a lesser radius of curvature than the radially more inward portions of the front face and of the back face.

2. The turbine wheel according to claim 1, wherein the radially inward portions of the front faces and of the back faces, respectively comprise at least 30% of the radial extent of a turbine blade, while the radially outer portions of the front faces and back faces, respectively comprise at least 30% of the radial extent of the turbine blades.

3. The turbine wheel according to claim 2, wherein the radii of curvature of the radially inward portions are at least 50%, or preferably 100%, greater than the radii of curvature of the corresponding radially outer portions of the front faces and back faces, respectively.

4. The turbine wheel according to claim 3, wherein the radius of curvature of a radially inward portion is no more than about four times the radius of curvature of the corresponding radially outer portion.

5. The turbine wheel according to one of claim 4, wherein the radius of curvature of the radially outer portion of the back face is between about 5% and 50% greater than the radius of curvature of the radially outer portion of the front face.

6. The turbine wheel according to claim 5, wherein the radius of curvature of the radially inward portion of the back face differs from the radius of curvature of the radially inward portion of the front face by -5% to 15%, preferably by 0 to 10%.

7. The turbine wheel according to claim 6, wherein the front face and the back face respectively have essentially two different radii of curvature, the different curvature portions merging smoothly into one another, with a continuous first derivative.

8. The turbine wheel according to claim 1, wherein the axial length of the turbine blades is at least 60%, preferably at least 65%, of the radial extent of the turbine blades.

9. The turbine wheel according to claim 1, wherein the axial length of the turbine blades is at least 65% of the radial extent of the turbine blades.

10. The turbine wheel according to claim 1, wherein the axial length of the turbine blades is at most 100% of the radial extent of the blades.

11. The turbine wheel according to claim 1, wherein the axial length of the turbine blades is at most 80%, of the radial extent of the blades.

12. The turbine wheel according to claim 8, wherein the axial length of the turbine blades is approximately 70% ± 5% of the radial extent of the turbine blades.

13. The turbine wheel according to claim 11 wherein the axial length of the turbine blades is approximately 70% ± 5% of the radial extent of the turbine blades.

14. A turbine wheel for driving rapidly rotating tools, particularly for the rotating disks and/or domes of paint-spraying apparatus, said turbine wheel comprising:

a carrier plate formed as a circular disk or ring, said plate having a central axis and configured for mounting so as to be rotatable about the axis;

turbine blades disposed on the carrier plate in circular formation and curved in a direction perpendicular to the axis, said turbine blades comprising;

a front face; and

a back face, mounted so that said front and back faces are axially parallel;

wherein each of said faces has radially outer portions and radially inward portions with radii of curvature, such that at least portions of the front face have a lesser radius of curvature than the back face, and the radially outer portions of the front face and of the back face have a lesser radius of curvature than the radially more inward portions of the front face and of the back face and, wherein in a section perpendicular to the axis, the connecting line of the radially inward and of the radially outer edge of a turbine blade is inclined relative to a radius vector to the inner edge of the turbine blade, this being such that the outer edge of the turbine blade is ahead of the inner edge in the direction of rotation, the connecting line being inclined by 2° to 15°, preferably by 5° to 12°, and in particular by approximately 8° ± 1°, relative to the radius vector directed toward the inner edge of the turbine blade.

15. The turbine wheel according to claim 14, wherein the turbine blades further comprise inner and outer edges that are respectively rounded off with a small radius, the rounding radius of the inner edge being less than 0.1 mm, preferably less than 0.05 mm, and greater than 0.01 mm, and the rounding radius of the outer edge being less than 0.3 mm, preferably less than 0.2 mm, but greater than 0.1 mm.

16. The turbine wheel according to claim 15, wherein the turbine blade further comprises a pitch in the circumferential direction between 10° and 15°, preferably 12°.

17. The turbine wheel according to claim 16, wherein the blade ring further comprises an internal radius between 20 mm and 24 mm, preferably approximately 22 mm.

18. The turbine wheel according to claim 17, wherein the blade ring further comprises an external radius between 25 mm and 60 mm, in particular, approximately 27.5 mm.

19. The turbine wheel according to claim 1, wherein the blade further comprises an angular range over which the radially inward portion of the back side of the blade extends is between 28° and 40°, in particular, between 30° and 35°, and the angular range over which the radially outer portion of the back side of the turbine blade extends is between 60° and 90°, in particular, between 70° ± 5°, in each case relative to the center of curvature of the respective portions.

20. The turbine wheel according to claim 19, wherein the angular range over which the radially inward portion of the front face of the turbine blade extends is in an angular range between 35° and 45°, in particular, is 40° ± 2°, and the angular range over which the radially outer portion of the front face of the turbine blade extends is between 100° and 130°, in particular, is 115° ± 5°, in each case relative to the center of curvature of the respective portions.

21. The turbine wheel according to claim 1, wherein the transition of the radii of curvature from the radially inward to the radially outer portion is in each case located on a line connecting the centers of curvature of the respective radially inward and radially outer portion.